

## SAFETY AND SECURITY RESEARCH AND ITS RELATION TO VŠB-TU OSTRAVA

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Vision paper

**Abstract:** VŠB - Technical University of Ostrava has the research tradition, technical predisposition and intellectual background in both domains of safety and security. It is active at international level and ten years of tradition of independent Faculty of Safety Engineering confirms the vitality of safety and security research. VŠB-TUO has a potential to be leading institution in the safety and security research not only in region, but at national level.

**Key words:** Research, Safety, Security, VŠB-TUO.

### Introduction

Last few decades may be characterized by two contradictory tendencies: At one side, community in developed countries demands not only economic prosperity, but also increasing quality of life, including various safety and security aspects. On the other hand, despite of the fact, that there is no actual danger of armed international conflict in the Central Europe, the number and extend of other threats as major technological accidents, natural disasters, water, food and energy scarcity or intentional terrorist acts does not decrease. Safety and security thus have become priority, in both societal as research dimension. Various techniques and methods for increasing safety and security develop rapidly, and the interdisciplinary complex with the character of new scientific discipline oriented to safety and security has been created. This scientific discipline deals with danger, threat and risk. This discipline existence has been declared at Sorbona (Paris) in 1987 and named in French linguistic environment “cindynique” (from Greek κίνδυνος/kindunos - danger). Neither in the Anglophone environment, nor in Czech one, has been found and accepted convenient name for “cindynique” and attempts to introduce terms as “risicology” or “securitology” have not been successful, among other because of the fact, that they cover the part of scientific domain of the danger and risk only. Nevertheless, there is no doubt about the fact, that the science of danger is understood as an independent discipline (even if interlinked with other ones), and this science branch has independent theoretical apparatus, methods of scientific work, paradigm and well-defined subjects of study. It is important, because the “cindynique” enables to have safety and security as integrating element. From the point of view of research strategy

formation is more useful to base it on one scientific discipline, which profits from the collaboration with other disciplines and which plays the integrating role for overall strategy. This is better than to work with the series of disjunctive and mutually non-communicating research directions, which are connected only by overall objective - decreasing risk.

The research of danger, risk, safety and security involves certain problems of semantic character. The majority of European languages use originally one term for both safety and security (and differ them little bit synthetically by description), but safety and security are separated in English and consequently in international document. The situation is more complicated because even in English the difference is not unambiguous. For example, major accidents and natural disasters are understood sometimes as “safety” and sometimes as “security” issues. For the Faculty of Safety Engineering of VŠB - Technical University of Ostrava brings this situation some complications, because the Czech word “bezpečnost” means both safety and security and literal translation of the faculty name to English should be “Faculty of Safety and Security Engineering”.

The problem continues in research granting. National research priorities copy more or less international trends and linguistic situation may complicate the understanding of difference between safety and security. The typical case is the Czech research priority “bezpečnostní výzkum”, which linguistically should involve both security and safety, but in the fact it is security research only and does not fulfil expectations of safety researchers.

With the multidisciplinary character of science studying danger has the connection the wide spectrum of scientific branches, which are used for research and development. Generally, we can

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conclude, that solution of principal problems in the domain of safety and security demands the combination of three areas: natural science, technical science and social science. Without this combination we risk to obtain the fractional, partly and often non-functioning, formal solutions only. Typical example is occupational health and safety, which is today understood as interrelations of man - machine - environment, another one is the fight against terrorism, where natural sciences enable the detection of threat, understanding its behaviour in environment and the identification of persons. Technical sciences study and develop preventive and protective measures and important is also socially oriented research, fundamental for intelligence. On the other hand, the composition of multidisciplinary team capable to run such research is difficult and the number of good leaders of such team very limited.

## Materials and methods

### *International Framework*

Two main domains mentioned in the last chapter, safety and security, overlap partially, but in many aspects are separated. Traditional domains of safety are construction safety, fire safety, transport safety and occupational safety, which all have a long history. These domains are not the subject of revolutionary changes contemporary, rather develop steadily. The most dramatic changes occur in the domain of chemical safety, where the actualization of major accident prevention was followed by principal novelization of European chemical legislation (Regulations REACH (Regulation, 2006) and CLP (Regulation, 2008) and Directives ATEX (Directive, 1994; Directive 1999)). In the parallel, the new domains of material and technology safety appeared, concerning nanomaterials, biotechnologies, modified organisms etc., and all principal international organisations and bodies (EU, OECD, ILO, WHO, UN) emphasize the importance of safety in these domains. The series of research projects were realized in last years and even if the main wave probably has dropped already, this not the case of the nanotechnology safety, where the societal interest grows. Interesting moment is that the percentage of accepted project proposals in nanotechnology safety overcomes nearly twice the average.

Nowadays, there is rather large discussion in international scientific community, focused on the need to work in the high degree of uncertainty and we cannot exclude the principal change of paradigm. One from the possibilities is that we will have to abandon mechanistic vision of safety processes and

we will describe and model failures and disasters by means of deterministic chaos rather than by simplistic mechanic.

Approximately since 70's of last century, the new phenomenon appears in the safety - the focus on environmental safety. At the beginning, the attention was paid mainly to environment contamination, today is sustainability accepted as one from the principles of safety and for example, UNEP - United Nations Environmental Programme (UNEP, 2012) changed the programme "Cleaner production" to "Safer production". The new element appeared recently, and it is the "environmental security". Even such organisations as NATO accept environmental security as a priority issue and the problematic of natural disasters is a part of it. The importance of this domain increases with the climatic change and the VŠB-TUO is proud of participate principally on formulation of Czech national conception of environmental security.

Compare to the safety research, the domain of security was changed more dramatically, mainly in the last decade. This is, together with the link between Czech national research strategy and European one, why security research is discussed here in more depth in separated chapter.

### *Starting points of European security research*

The orientation of European security research is defined by ESRIF - European Security Research and Innovation Forum (European Communities, 2006). In the year 2009, ESRIF introduced European Security Research Agenda - ESRIA as a life document presenting cross-section agenda of European security research for next 20 years. Technological capacities of EU are the key for the success in strengthening of European capacity to react effectively and flexibly to natural and anthropogenic threats and to realize following remediation and recovery.

ESRIF declares eight thematic domains of security research and three cross-sections:

#### *Thematic domains:*

- Security of citizens
- Critical infrastructures security
- Borderlines security
- Crisis management
- Scenarios
- CBRN security
- Situation preparedness and space
- Identification of humans and property

*Cross-sections:*

- Innovation
- Governance and coordination
- Human and societal dynamic of society

Many other important international organizations (NATO, UN, OECD...) involve security to priorities and even if each organization refers to its specificity, the general set of priorities does not differ significantly.

European Union pays attention to the security research, which, together with the safety, belongs among research priorities. In the programme PASR (2004-2006), which has the budget of 45 mi. EUR, was financed 39 projects and in 7 of them, Czech research institutes participated.

In the first two calls of 7 FP, Czech teams participated in 16 projects with budget 3.3 mil EUR. All security research of 7 FP in first two calls involved 84 projects (304 mil EUR). Czech subjects were oriented to security research in domains of information and communication technologies, psychology, crisis management, economy and governance. VŠB-TUO was involved as an active partner, together with SUJB, T-Soft, UK, VUT Brno, University of Defence and MU Brno.

## Results

### *Conditions in the Czech Republic*

Safety and security are clear priorities of the Czech research and development. In the central evidence of R&D in Czech, there is 295 projects with keyword safety and 129 with keyword security and for these projects is allocated the budget of 4.75 billion of CZK (about 190 mil EUR). The security research is managed by Ministry of Interior and it attracts research institution. Some projects oriented to safety are involved in security research, but rather because of misunderstanding of nomenclature than because of intention.

Despite of wide activities in the research, the situation in Czech Republic is accompanied by two tendencies: The security research, falling to the competence of Ministry of Interior, is significantly more supported than couple of years ago and, on the other hand, the research in some traditional domains like OHS and some issues of environment was attenuated. The reason is the detraction of direct research financing from some ministries (e.g. environment) combined with complicated financial and political situation.

Even if the majority of danger and risk oriented research is today concentrated in security research programme, still the wide space for safety rests. In the frameworks of programmes Alpha, Beta and Omega of the Technology Agency of Czech Republic, there are clearly defined objectives and priorities showing it.

In the programme Alpha specification is declared, that demanded results have to be economically, environmentally and safety efficient. In all three sub-programmes of Alpha - Progressive technology, materials and systems, Energy sources and environment protection and Sustainable transport, is safety involved.

The programme Omega is focused on strengthening of research activities in applied social sciences, but among priorities is the policy of labour market, including occupational health and safety. Programme Beta is devoted to the research support of government, especially the organizations which cannot finance research directly.

Unfortunately, the possibilities of application of safety research in Grant Agency of the Czech Republic, oriented to basic research, are rather unclear. The participation of public sector is not easy to estimate, because of unavailability of data.

Generally, the policy of Czech government supports security research and in certain extends the safety research as well. In last year, the government project "Priority 2030" was realized with the objective of proposing the recommendation of priorities of the research to the year 2020 with the outlook for the year 2030. One from 6 committees was focused to safety and security and VŠB-TUO had the representation in this Committee.

### *Situation at VŠB – Technical University of Ostrava*

In the long-term strategy of development, VŠB-TUO declared safety and security research as one from six research priorities (VŠB-TUO, 2012). At the department's level, the ten years continuity of safety and security research strategy exists in documents of the Laboratory of Risk Research and Management (Labrisk, 2012) and the research in specific domain of energy safety is the programme of newly created unit INEF (Innovation for Efficiency and Environment) (Energy Research Centre, 2012), common workplace of Laboratory of Risk Research and Management and Energy Research Centre.

Key position in safety and security research has the Faculty of Safety Engineering. Despite the fact, that Faculty has a long tradition in firesafety, crisis management, OHS and prevention of major

accidents, its integrating position should be strengthened and the role of leading research centre and coordination of safety and security research at all University is still the challenge. As a perspective, one can mention collaboration with Faculty of Civil Engineering and construction safety research and common research activities with Department of Transport. Faculty of Safety Engineering runs several projects of security research and other, safety oriented projects and the positive aspect is, that leading position in these projects has the young generation of researchers.

Tradition of mining schools is connected with safety and industrial safety origins in mining. The Faculty of Mining and Geology keeps the tradition. Basic domains are mining safety, natural risks and the use of geo-informatics in safety management.

The domain, which is tightly interlinked with safety and security, is the environment protection. VŠB-TUO profits from interdisciplinarity of faculties and is active at this field. The research of environmental safety and security lead to the participation in preparation of national conception of environmental safety and the wide collaboration with the Ministry of Environment. University is active at international level and its researchers have participated as experts in several bodies: ad-joint expert group of UNECE conventions on transboundary accidents and protection of international lakes and watercourses, OECD working group on industrial accidents, the Committee of competent authorities of Seveso II Directive and NATO expert panel on environmental security.

Another important segment is an information safety and both aspects - use of informatics in safety and security and information security are covered

In the national database of the Central Evidence of Projects (Rada pro výzkum, vývoj a inovace, 2012). is registered under VŠB-TUO 17 projects with keyword "safety" with overall budget for all partners 534 mil. CZK (21 mil EUR) and 7 projects with keyword "security" (50 mil CZK/ 2 mil EUR). VŠB is positively evaluated in the 7 FP, but still is the third among Czech universities, after UK and CVUT.

With regards to safety research, VŠB is the leading partner in both Czech Technological Platform on Industrial Safety and Safety Cluster. Both institutions are located in premises of VŠB-TUO. The intention of both Platform and Cluster is to concentrate safety research in the region of Northern Moravia and Silesia.

## Conclusion

VŠB - Technical University of Ostrava has the research tradition, technical predisposition and intellectual background in both domains of safety and security. It is active at international level and ten years of tradition of independent Faculty of Safety Engineering confirms the vitality of safety and security research. New generation of researchers appears and connection with international science deepens. Both government and industry are users of provided safety and security research. Even if there are still obstacles and gaps, VŠB-TUO has a potential to be leading institution in the safety and security research not only in region, but at national level.

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